

### Abstract

A chemical mechanical polishing apparatus includes a platen to support a polishing pad, and a polishing head to hold a substrate against the polishing pad during processing. The  
5 substrate includes a thin film structure disposed on a wafer. A first optical system includes a first light source to generate a first light beam which impinges on a surface of the substrate, and a first sensor to measure light reflected from the surface of the substrate to generate a measured first interference signal.

10 A second optical system includes a second light source to generate a second light beam which impinges on a surface of the substrate and a second sensor to measure light reflected from the surface of the substrate to generate a measured second interference signal. The second light beam has a wavelength  
15 different from the first light beam.

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